


IN THE UNITED STATES PATENT  
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Daniel A. Hilbrich	)	Service in an envelope addressed to:
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U.S. Patent No. 6,016,740	)	Assistant Commissioner for Patents, Box
	)	Patent Application, Washington D.C.
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FOR: FILTERING DEVICE FOR AN	)	States Postal Service under Mailing Label
ESPRESSO-TYPE COFFEE MAKER	)	No. EK 657 825 908 US on this date:
	)	
Filed: Herewith	)	January 15, 2002
	)	
Probable Group Art Unit: 1761	)	
	)	Richard Zimmerman
Probable Examiner: R.L. Alexander	)	

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
Box Patent Application  
Washington, D.C. 20231

Sir:

Prior to examination of the above-referenced application, please amend the application as follows and consider the following remarks:

**In the Specification:**

Please replace the paragraph beginning at column 1, line 5, with the following rewritten paragraph:

The invention relates to filtering devices for an espresso-type coffee maker and methods for making lower lipids-containing coffee in an espresso-type coffee maker.

Please replace the paragraph beginning at column 1, line 10, with the following rewritten paragraph:

Espresso-type coffee makers are well known. Typically, the espresso-type coffee makers deliver hot water having an optimum temperature of approximately 96 degrees Centigrade through very finely ground coffee in a permanent filter pan, usually a metallic filter pan, using a driving pressure of 3 bar to 15 bar. Examples of espresso-type coffee makers are described and depicted in U.S. Pat. Nos. 5,280,747; 5,392,694; 4,882,982; and 5,150,645. Current technology in espresso filtration provides for a finely fenestrated permanent filter, which is typically metallic, on top of which are situated coffee grounds, 0.3 millimeters or less in particle size. This permanent filter functions to intercept most of the coffee grounds while allowing the liquid coffee beverage along with its oils and some fine particulate grounds to pass into the awaiting cup. Although such filtration of particulate matter (grounds), until presently, has been considered "state of the art" world-wide, recent proof that the lipid fraction (coffee oils) as well as the fine particulate coffee grounds which escape filtration in this previously described system, are indeed harmful to the human organism, has come to light. The compounds cafestol and kahweol (herein "C" and "K") present in the coffee oils in the fine particulate coffee grounds (both of which escape permanent filtration; see above) have been extensively studied by medical researchers and have been conclusively shown to substantially elevate serum cholesterol, triglycerides, and liver function tests. See, for example, P. Zock, M. B. Katan, M. P. Merkus, et al., *Effect of a Lipid-Rich Fraction from Boiled Coffee on Serum Cholesterol*, Lancet 1990; 335:1235-7; H. Heckers, U. Gobel & U. Kleppel, *End of the Coffee Mystery: Diterpene Alcohols Raise Serum Low-Density Lipoprotein Cholesterol and Triglyceride Levels*, Journal of Internal Medicine, (J. Int. Med.) 1994; 235:192-3; R. Urgert, A. G. M. Schultz & M. B. Katan, *Effects of Cafestol and Kahweol from Coffee Grounds on Serum Lipids and Serum Liver Enzymes in Humans*, American Journal of Clinical Nutrition (AM. J. Clin. Nutr.) 1995; 61:149-54; W. Weusten-Van Der Wouw, et al., *Identity of the Cholesterol-Raising Factor from Boiled Coffee and its Effects on Liver Functions Enzymes*, Journal of Lipid Research (J. Lipid[.] Res.) 1994; 35:721-33; E. Arnesen, N. E. Huseby, T. Brenn & K. Try, *The Tromsø Heart Study, Distribution of, and Determinants for, Gamma-Glutamyl Transferase in a free Living*

*Population*, Scandinavian Journal of Clinical Laboratory Investigation, (Scand. J. Clin. Lab. Invest.) 1986; 46:63-70; O. Nilssen, D. H. Forde, & T. Brenn, *The Tromso Study. Distribution and Population Determinates of Gamma-Glutamyl Transferase*, American Journal of Epidemiology (AM. J. Epidemiol.) 1990; 132:318-26; *Ulmann's Encyclopedia of Industrial Chemistry-5th Edition*, 1986; Vol. A7:pg. 334; M. Van Desselcorp, et al., *Cholesterol-Raising Factor from Boiled Coffee does not Pass a Paper Filter*, Arteriosclerosis and Thrombosis 1991; 11:586-93.

Please replace the paragraph beginning at column 1, line 62, with the following rewritten paragraph:

About 18% of Arabic coffee (bean) is lipid (oil). Of that 18%, 20% is composed of fatty acid esters of the diterpene alcohols known as cafestol and kahweol. The aforementioned Zock, et al. article showed that the lipid (oil) rich floating on the surface of boiled coffee raised the serum LDL-C cholesterol and serum triglycerides (both atherogenic) by 29% and 55% respectively. The aforementioned Heckers, et al. article found that subjects given 148 mg of C and K daily for one month had a 50% increase in serum LDL-C and an 87% increase in serum triglycerides. One double espresso (approximately 30 cc) can contain up to 24 mg of C and K in a single cup. Furthermore, the espresso brewing method was shown by Urgert, et al. in the *Journal of Agricultural and Food Chemistry*, August 1995 to be the most effective at extracting the harmful compounds C and K, when compared to other brewing methods, i.e. drip vs. boil vs. percolation and the like.

Please replace the paragraph beginning at column 2, line 12, with the following rewritten paragraph:

The previously cited article by Urgert, et al. confirms these results, but the studies there described are based on the C and K found in the particulate grounds found at the bottom of the coffee cup. The particulate grounds which escaped filtration were found to be potent carriers of C and K and in addition to raising cholesterol and triglycerides C and K were found to elevate liver enzymes serum ALT (alanine aminotransferase) and serum AST (aspartate aminotransferase) to a lesser extent. These liver enzymes, when elevated, can

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indicate hepatocellular (liver) disfunction and/or damage. Other researchers confirmed the adverse effects of C and K on liver function. See, for example, the Urgert, et al., Weusten-Van Der Woy, et al., Arnesen, et al., and Nilssen, et al. references cited above.

Please replace the paragraph beginning at column 2, line 26, with the following rewritten paragraph:

This evidence clearly establishes the need for a filter which can reduce the harmful oils and unfiltered grounds present in an espresso coffee beverage, which is what the invention can accomplish.

Please replace the paragraph beginning at column 2, line 30, with the following rewritten paragraph:

It has been discovered that paper coffee filters can remove substantially the C and K in coffee beverages by filtering both the oils and small particulate grounds which have been found to contain C and K. See the Urgert, et al. and Van Desseldorp, et al. papers cited above. Prior to the invention, paper filters have not been developed for espresso-type coffee makers since they appeared to be redundant to the metallic or other permanent filter, or it was felt paper filters were unsuitable for use.

Please replace the paragraph beginning at column 2, line 40, with the following rewritten paragraph:

A principal feature of the invention is the precision of an improved filtering device for an espresso-type coffee maker.

Please replace the paragraph beginning at column 2, line 43, with the following rewritten paragraph:

The espresso-type coffee maker is of the type having a spout to deliver heated water under pressure, and a receptacle to receive the brewed filtered coffee. The filtering device has a permanent filter in the path of heated coffee passing to the receptacle. In accordance with the invention, filter paper is provided in the flow path of the liquid brewed coffee which

removes a substantial part of the coffee oils and particulate grounds which escape the permanent filter. These substances contain cafestol and kahweol and thus, these undesirable substances are, at least partly, removed from the brewed coffee liquid.

Please replace the paragraph beginning at column 2, line 54, with the following rewritten paragraph:

Thus, one advantage of the invention is that the filtering device substantially prevents, in the consumers of its treated coffee, the raising of serum LDL cholesterol, liver enzymes (ALT)<sub>2</sub> and triglycerides, all of which are potentially dangerous.

Please replace the paragraph beginning at column 2, line 59, with the following rewritten paragraph:

Yet another advantage of the invention is that removal of the frequently rancid, bitter coffee oils and grounds can improve the flavor of the coffee beverage.

Please replace the paragraph beginning at column 3, line 20, with the following rewritten paragraph:

FIG. 1 is an elevational view, partly in section, of an espresso-type coffee maker incorporating the principles of the invention.

Please replace the paragraph beginning at column 3, line 23, with the following rewritten paragraph:

FIG. 2 is a perspective view of one part of the apparatus of FIG. 1, namely a disposable filter made in accordance with the principles of the invention.

Please replace the paragraph beginning at column 3, line 34, with the following rewritten paragraph:

Referring to FIG. 1, there is shown an espresso-type coffee maker, generally designated 9, with a filtering device, generally designated 10. The coffee maker 9 is of the type which delivers hot water under pressure to spouts 12, after which the heated water passes

through ground coffee beans CG in the filtering device to a receptacle 14, such as a cup, which receives the heated coffee.

Please replace the paragraph beginning at column 3, line 41, with the following rewritten paragraph:

The filtering device 10 has a holding pan 16, which receives a permanent filter, such as a perforated metallic filter 18 of known type in espresso-type coffee makers. The holding pan 16 may have a rubber O-ring 20 to sealingly engage against an outer surface of the metallic filter 18 and ensure that the hot water is pumped through the coffee CG and filter under pressure.

Please replace the paragraph beginning at column 3, line 47, with the following rewritten paragraph:

The holding pan 16 has a conical chamber 22 beneath the metallic filter 18 which communicates with a passageway 26 leading to the receptacle 14. A paper filter 30 is removably placed on top of the metallic filter 18 between the coffee grounds CG and the metallic filter 18. The paper filter may be of the type sold under the trademark MR. COFFEE for conventional (non-pressurized) type coffee makers, and the filters may be cut to size to fit the base of the metallic filter 18. In a preferred form, the filter 30 may be made of a plurality of layers of the paper layers such as the two layers 31, 32 shown in FIG. 3, each of which has a conventional thickness for non-espresso coffee filters. These layers are crimped together about their perimeter as indicated at 34. This forms an easily handled, disposable, multi-layer filtering unit. Thus, the coffee grounds CG are filtered by the metallic filter 18, and the brewed coffee is also filtered by the paper filter 30 to remove harmful lipids and coffee grounds which may effect a rise in the cholesterol levels in a user of the brewed coffee. The modified paper filter 30 is preferably placed directly on the metallic filter 18, and the ground coffee beans CG are placed directly onto the paper filter.

Please replace the paragraph beginning at column 4, line 3, with the following rewritten paragraph:

A prototype of the filtering device was constructed, tested, and shown to be effective. The prototype was sized and shaped to fit the espresso holding pan of a Rancilio brand machine, Model No. MISS 935624, made by Rancilio of Italy. Thus, it was approximately circular in shape with a diameter of approximately 5 cm (which, of course, can be custom made to fit any size holding pan) and was formed of two layers of standard filter paper derived from filters of the cone variety. It was, as a consequence, twice the standard thickness of conventional coffee filters.

Please replace the paragraph beginning at column 4, line 14, with the following rewritten paragraph:

Some tests were made on the filtering device 10 as follows. First, in order to determine the amount of oil in the coffee brewed without use of the paper filter, some coffee was brewed and allowed to chill in a refrigerator for two to three hours in order to allow the oils to get on the surface of the liquid air interface. Copious quantities of lipids were found on the unfiltered coffee. On the other hand, approximately 80% less lipids were found on coffee which was filtered by one layer of the paper filter 30, while approximately 95% of the lipids were removed from the coffee when two layers of the paper filter 30 were used. Negligible quantities of fine particulate coffee grounds were noted at the bottom of the cup when either one or two layers of filter paper were used compared to none. These observations are in agreement with other studies performed, such as those referred to above in the articles of Urgert, et al. and Van Desselorp, et al.

Please replace the paragraph beginning at column 4, line 38, with the following rewritten paragraph:

The foregoing detailed description is for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as modifications will be obvious to those skilled in the art.

Please delete the paragraph beginning at column 4, line 43, in its entirety.

In the Claims:

Please amend claim 1 as follows:

1. (Amended) A filtering device for an espresso-type coffee maker of the type having a spout to deliver heated water under high pressure to finely ground coffee beans to brew coffee therefrom, and a receptacle to receive brewed filtered coffee, means defining a flow path between said finely ground beans to said receptacle, comprising:

a permanent filter in said path of heated coffee passing to the receptacle which filter has openings sized to filter out the fine espresso coffee grounds; and

at least one layer of filter paper in the path of the heated coffee passing to the receptacle.

Please amend claim 4 as follows:

4. (Amended) In an espresso-type coffee maker of the type that delivers heated water under elevated pressure to a pan in which finely ground coffee beans are present and from which brewed coffee is removed through a permanent filter, the improvement of a disposable paper filter across the flow path of the brewed coffee, said paper filter being of a thickness and size so as to effectively remove and trap lipids and fine grounds from the brewed coffee and to reduce the lipids in the brewed coffee and wherein said paper filter is sized and shaped to fit over and adjacent the top of said permanent filter between said permanent filter and said finely ground coffee and said finely ground coffee is positioned above and on said paper filter so that the paper filter also serves to aid in removing, in a single operation, the used grounds as well as the paper filter from the coffee maker.

Please amend claim 5 as follows:

5. (Amended) The improvement of claim 4 wherein the paper filter is of such a thickness and size so as to effectively remove and trap lipids and fine particulate grounds from the brewed coffee so as to remove approximately 95% of the lipids that would be present absent the paper filter.



Please amend claim 6 as follows:

6. (Amended) The improvement of claim 4 wherein said filter paper is made up of at least two layers of standard thickness coffee filter paper.

Please amend claim 7 as follows:

7. (Amended) A method of making lower lipids containing brewed coffee liquid in an espresso-type coffee maker of the type that makes coffee liquid by passing heated water under elevated pressure through finely ground coffee beans held above a permanent filter comprising the steps of placing disposable paper coffee filter material, of the type that may absorb lipids, and of a size and shape to cover the permanent filter in the maker atop and covering the permanent filter, placing the finely ground coffee beans atop said paper coffee filter material and passing heated water at an elevated pressure through, sequentially, the coffee beans, said paper filter material, and said permanent filter to create brewed coffee liquid and to allow lipids therefrom to be absorbed by said paper filter material so as to make lower lipid containing coffee liquid.

Please add claims 8-28 as follows:

--8. The device of claim 1, wherein the permanent filter comprises a metallic filter.

9. The improvement of claim 4, wherein the heated water is under a pressure of at least 3 bar.

10. The improvement of claim 4, wherein the heated water is under a pressure of from 3 to 15 bar.

11. The improvement of claim 4, wherein the paper filter is of such a thickness and size so as to effectively remove and trap lipids and fine particulate grounds from the brewed coffee so as to remove at least 50% of the lipids that would be present absent the paper filter.

12. The improvement of claim 4, wherein the finely ground coffee has grounds of 0.3 mm or less in particle size.

13. The method of claim 7, wherein the heated water is under a pressure of at least 3 bar.

14. The method of claim 7, wherein the heated water is under a pressure of from 3 to 15 bar.

15. The method of claim 7, wherein the paper filter is of such a thickness and size so as to effectively remove and trap lipids and fine particulate grounds from the brewed coffee so as to remove at least 50% of the lipids that would be present absent the paper filter.

16. The method of claim 7, wherein the finely ground coffee has grounds of 0.3 mm or less in particle size.

17. A method of making lower lipids containing brewed coffee liquid in an espresso-type coffee maker of the type having a spout to deliver heated water under elevated pressure to finely ground coffee beans to brew coffee therefrom and a receptacle to receive brewed coffee and having a flow path defined between said finely ground beans to the receptacle including a permanent filter in the flow path, comprising:

placing at least one layer of filter paper in the flow path; and

passing heated water at an elevated pressure sequentially through the finely ground coffee beans, the at least one layer of filter paper, and the permanent filter to the receptacle.

18. The method of claim 17, wherein the permanent filter comprises a metallic filter.

19. The method of claim 17, wherein the filter paper comprises a plurality of layers.

20. The method of claim 19, wherein the filter paper layers are crimped together to form an easily handled unit.

21. A filter for use in an espresso-type coffee maker of the type that delivers heated water under elevated pressure to a pan in which finely ground coffee beans are present and from which brewed coffee is removed through a permanent filter, the filter comprising:

a layer of paper filter material of a size and shape to fit over and adjacent a top of the permanent filter between the permanent filter and the finely ground coffee beans, the paper filter material having a thickness to effectively remove and trap lipids and fine grounds from the brewed coffee and to reduce the trapped lipids in the brewed coffee.

22. The filter of claim 21, wherein the heated water is under a pressure of at least 3 bar.

23. The filter of claim 21, wherein the heated water is under a pressure of from 3 to 15 bar.

24. The filter of claim 21, wherein the paper filter material is of such a thickness and size so as to effectively remove and trap lipids and fine particulate grounds from the brewed coffee so as to remove at least 50% of the lipids that would be present absent the paper filter.

25. The filter of claim 21, wherein the paper filter material is of such a thickness and size so as to effectively remove and trap lipids and fine particulate grounds from the brewed coffee so as to remove approximately 95% of the lipids that would be present absent the paper filter.

26. The filter of claim 21 further comprising a second layer of paper material.

27. The filter of claim 21, wherein the shape of the paper filter material is approximately circular.

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28. The filter of claim 27, wherein the circular paper filter material has a diameter of approximately 5 centimeters.--

REMARKS

Claims 1-28 are presented herein for consideration. The claim set includes amended claims 1 and 4-7, and new claims 8-28. In view of the remarks presented herein, consideration and allowance of all pending claims are respectfully requested.

Several amendments to the specification are presented herein to correct obvious and typographical errors, and to improve the style and readability of the specification. Other amendments are made to provide explicit, rather than implicit, support for language used in the claims. No new matter has been introduced with these amendments to the specification.

The amendments to the specification also address inaccuracies in the disclosure. For example, the paragraph at column 2, line 26, now states that there is a need for a filter which can reduce the harmful oils and unfiltered grounds, which is accomplished by the present invention. Prior to this amendment, that paragraph stated a need to "rid" an espresso coffee beverage of its harmful oils and unfiltered grounds. To the extent that "rid" means to completely eliminate, applicants submit the amended language to more clearly indicate the capabilities of the claimed device and method.

Turning to the claims, claim 1 has been amended to specify a permanent filter rather than a "metallic" filter. Support for this language is found in claims 4 and 7, each of which specify a "permanent filter."

Claim 4 has been amended to recite that the water in the espresso-type coffee maker is delivered at an elevated pressure, rather than under "3 to 15 bar" of pressure. Support for this language is found at column 3, lines 36-37, which note in part that heated water is delivered "under pressure" to the spout of the coffee maker. Claim 4 was also amended to remove the limitation that lipid reduction in the coffee by the filter is at least 50%. Support for this language is found at column 3, lines 62-66, which state in part that, "the brewed coffee is also filtered by the paper filter 30 to remove harmful lipids..."

Claims 5 and 6 are amended to replace the word "invention" with the word improvement to make the preambles of the subject claims more consistent with claim 4, from which they depend.

Claim 7 has been amended in two areas to recite that the water in the espresso-type coffee maker is delivered at an elevated pressure, rather than under "3 to 15 bar" of pressure.

Support for this language is found at column 3, lines 36-37, as noted above.

Added claims 8-11 and 13-15 depend from one of claims 1, 4, and 7. Each of these claims recites an element that appeared in the associated independent claim, but was removed by the amendments presented above. Accordingly, these claims are adequately supported by the specification.

Added claims 12 and 16 depend from claims 4 and 7, respectively. Each of these claims recites that the finely ground coffee has grounds of 0.3mm or less in particle size. Support for this language is found in the specification at column 1, lines 17-19.

Added independent claim 17 specifies a method of making lower lipids containing brewed coffee liquid in an espresso-type coffee maker of the type having a spout to deliver heated water under elevated pressure to finely ground coffee beans to brew coffee therefrom. The espresso-type coffee maker also has a receptacle to receive brewed coffee and a flow path defined between the finely ground beans to the receptacle, including a permanent filter in the flow path. The method comprises placing at least one layer of filter paper in the flow path, and passing heated water at an elevated pressure sequentially through the finely ground coffee beans, the at least one layer of filter paper, and the permanent filter to the receptacle. Independent claim 17 is similar, although not identical, to claim 7, and therefore this claim is adequately supported by the specification.

The specification also provides support for added claims 18-20, which depend directly or indirectly from claim 17. Support for the metallic filter recited in claim 18 is found at column 3, lines 41-43. Claim 19, which recites a filter paper comprising a plurality of layers, finds support at column 3, lines 55-59. The crimped together filter paper layers of claim 20 are supported at column 3, lines 59-62.

Added independent claim 21 specifies a filter for use in an espresso-type coffee maker of the type that delivers heated water under elevated pressure to a pan in which finely ground coffee beans are present and from which brewed coffee is removed through a permanent filter. The filter comprises a layer of paper filter material of a size and shape to fit over and adjacent a top of the permanent filter between the permanent filter and the finely ground coffee beans, the paper filter material having a thickness to effectively remove and trap lipids and fine grounds from the brewed coffee and to reduce the trapped lipids in the brewed

coffee. Independent claim 21 is similar, although not identical, to claim 4, and therefore this claim is adequately supported by the specification.

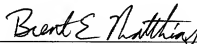
Claims 22-28 dependent directly or indirectly on claim 21 are also supported by the specification. Support for the subject matter of claims 22-26 has been identified above. Claim 27, which recites that the shape of the paper is approximately circular, and claim 28, which recites that the circular paper filter material has a diameter of approximately 5 centimeters, find support in the specification at column 4, lines 7-8.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Claims 1-28 appearing in the present application are in good and proper form for allowance. Consideration and allowance of the claims is respectfully requested.

If, in the opinion of the Examiner, a telephone conference would expedite prosecution of the subject application, the Examiner is invited to telephone the undersigned attorney.

Respectfully submitted,



Brent E. Matthias, Reg. No. 41,974  
MARSHALL, GERSTEIN & BORUN  
6300 Sears Tower  
233 S. Wacker Drive  
Chicago, Illinois 60606  
Tel.: (312) 474-6300  
Fax: (312) 474-0448

January 15, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

The paragraph beginning at column 1, line 5, has been amended as follows:

The [present] invention relates to filtering devices for an espresso-type coffee maker and methods for making lower lipids-containing coffee in an espresso-type coffee maker.

The paragraph beginning at column 1, line 10, has been amended as follows:

Espresso-type coffee makers are well known. Typically, the espresso-type coffee makers deliver hot water having an optimum temperature of approximately 96 degrees Centigrade through very finely ground coffee in a [metallic] permanent filter pan, usually a metallic filter pan, using a driving pressure of 3 bar to 15 bar. Examples of espresso-type coffee makers are described and depicted in U.S. Pat. Nos. 5,280,747; 5,392,694; 4,882,982; and 5,150,645. Current technology in espresso filtration provides for a finely fenestrated [metallic] permanent filter, which is typically metallic, on top of which are situated coffee grounds, 0.3 millimeters [in size] or less in ([particle size]). This [metallic] permanent filter functions to intercept most of the coffee grounds while allowing the liquid coffee beverage along with its oils and some fine particulate grounds to pass into the awaiting cup. Although such filtration of particulate matter (grounds), until presently, has been considered "state of the art" world-wide, recent proof that the lipid fraction (coffee oils) as well as the fine particulate coffee grounds which escape filtration in this previously described system, are indeed harmful to the human organism, has come to light. The compounds cafestol and kahweol[,] ([here] herein "C" and "K") present in the coffee oils in the fine particulate coffee grounds (both of which escape [metallic] permanent filtration; see above) have been extensively studied by medical researchers and have been conclusively shown to substantially elevate serum[,] cholesterol, triglycerides, and liver function tests. See, for example, P. Zock, M. B. Katan, M. P. Merkus, et al., *Effect of a Lipid-Rich Fraction from Boiled Coffee on Serum Cholesterol*, Lancet 1990; 335:1235-7; H. Heckers, U. Gobel & U. Kleppel, *End of the Coffee Mystery: Diterpene Alcohols Raise Serum Low-Density Lipoprotein Cholesterol and Triglyceride Levels*, Journal of Internal Medicine, (J. Int. Med.) 1994; 235:192-3; R. Urgert, A. G. M. Schultz & M. B. Katan, *Effects of Cafestol and Kahweol from Coffee* [Ground Son



*Serm] Grounds on Serum Lipids and Serum Liver Enzymes in Humans*, American Journal of Clinical Nutrition (AM. J. Clin. Nutr.) 1995; 61:149-54; W. Weusten-Van Der [Woy] Wouw, et al., *Identity of the Cholesterol-Raising Factor from Boiled Coffee and its Effects on Liver Functions Enzymes*, Journal of Lipid Research (J. Lipid[.] Res.) 1994, 35:721-33; E. Arnesen, N. E. Huseby, T. Brenn & K. Try, *The Tromso Heart Study, Distribution of, and Determinants for, Gamma-Glutamyl Transferase in a free Living Population*, Scandinavian Journal of Clinical Laboratory Investigation, (Scand. J. Clin. Lab. Invest.) 1986; 46:63-70; O. [Nelssen] Nilssen, D. H. Forde, & T. Brenn, *The Tromso Study. Distribution and Population Determinates of Gamma-Glutamyl Transferase*, American Journal of Epidemiology (AM. J. Epidemiol.) 1990; 132:318-26; *Ulmann's Encyclopedia of Industrial Chemistry-5th Edition*, 1986; Vol. A7:pg. 334; M. Van Desseldorp, et al., *Cholesterol-Raising Factor from Boiled Coffee does not Pass a Paper Filter*, Arteriosclerosis and Thrombosis 1991; 11:586-93.

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The previously cited article by Urgert, et al. confirms [the above] these results, but the studies there described are based on the C and K found in the particulate grounds found at the bottom of the coffee cup. The particulate grounds which escaped filtration were found to be

potent carriers of C and K and in addition to raising cholesterol and triglycerides C and K were found to elevate liver enzymes serum ALT (alanine aminotransferase) and serum AST (aspartate aminotransferase) to a lesser extent. These liver enzymes, when elevated, can indicate hepatocellular (liver) disfunction and/or damage. Other researchers confirmed the adverse effects of C and K on [the] liver function [tests]. See, for example, the [aforecited] Urgert, et al., Weusten-Van Der Wouw, et al., [Amesen] Arnesen, et [aL.] al. and Nilssen, et [aL.] al. references cited above.

The paragraph beginning at column 2, line 26, has been amended as follows:

This [assemblage of] evidence clearly establishes the need for a filter which can [rid an espresso coffee beverage of its] reduce the harmful oils and unfiltered grounds present in an espresso coffee beverage, which is what the [present] invention can accomplish.

The paragraph beginning at column 2, line 30, has been amended as follows:

It has been discovered that paper coffee filters can remove substantially the C and K in coffee beverages by filtering both the oils and small particulate grounds which have been found to [house] contain C and K. See the [aforecited] Urgert, et [aL.] al. [paper] and [the article by] Van Desseldorp, et [aL.] al. papers cited above. Prior to the [present] invention, paper filters have not been developed for espresso-type coffee makers since [it would appear] they appeared to be redundant to the metallic or other permanent filter, or it was felt paper filters were unsuitable for use.

The paragraph beginning at column 2, line 40, has been amended as follows:

A principal feature of the [present] invention is the precision of an improved filtering device for an espresso-type coffee maker.

The paragraph beginning at column 2, line 43, has been amended as follows:

The espresso-type coffee maker is of the type having a spout to deliver heated water under pressure, and a receptacle to receive the brewed filtered coffee. The filtering device has a [metallic] permanent filter in the path of heated coffee passing to the receptacle. In

accordance with the [present] invention, filter paper is provided in the flow path of the liquid brewed coffee which removes a substantial part of the coffee oils and particulate grounds which escape [metallic filtration] the permanent filter. These substances [house the] contain cafestol and kahweol [previously discussed] and thus, these undesirable substances are, at least partly, removed from the brewed coffee liquid.

The paragraph beginning at column 2, line 54, has been amended as follows:

Thus, one advantage of the invention is that the filtering device [of the present invention] substantially prevents, in the consumers of its treated coffee, the raising of serum LDL cholesterol, liver enzymes (ALT), and triglycerides, all of which are potentially dangerous [perturbations].

The paragraph beginning at column 2, line 59, has been amended as follows:

Yet[,] another advantage of the invention is that [the] removal of the frequently rancid, bitter coffee oils and grounds can improve the flavor of the coffee beverage.

The paragraph beginning at column 3, line 20, has been amended as follows:

FIG. 1 is an elevational view, partly in section, of an espresso-type coffee maker incorporating the [principals] principles of the [present] invention.

The paragraph beginning at column 3, line 23, has been amended as follows:

FIG. 2 is a perspective view of one part of the apparatus of FIG. 1, namely a disposable filter made in accordance with the [principals] principles of the [present] invention.

The paragraph beginning at column 3, line 34, has been amended as follows:

Referring [now] to FIG. 1, there is shown an espresso-type coffee maker, generally designated 9, with a filtering device, generally designated 10. The coffee maker 9 is of the type which delivers hot water under pressure to spouts 12, after which the heated water passes through ground coffee beans CG in the filtering device to a receptacle 14, such as a cup, which receives the heated coffee.

The paragraph beginning at column 3, line 41, has been amended as follows:

The filtering device 10 has a holding pan 16, which receives a permanent filter, such as a perforated metallic filter 18 of known type in espresso-type coffee makers. The holding pan 16 may have a rubber O-ring 20 to sealingly engage against an outer surface of the metallic filter 18 and ensure that the hot water is pumped through the coffee CG and [filters] filter under pressure.

The paragraph beginning at column 3, line 47, has been amended as follows:

The holding pan 16[,] has a [conic] conical chamber 22 beneath the metallic filter 18 which communicates with a passageway 26[, then to a] leading to the receptacle 14. [In accordance with the present invention, a] A paper filter 30 is removably placed on top of the metallic filter 18 ["sandwiched"] between the coffee grounds CG and the metallic filter 18. The paper filter may be of the type sold under the trademark MR. COFFEE for conventional (non-pressurized) type coffee makers, and the filters may be cut to size to fit the base of the metallic filter 18. In a preferred form, the filter 30 may be made of a plurality of layers of the paper layers such as the two layers 31, 32 shown in FIG. 3, each of which [layer is of the] has a conventional thickness for non-espresso coffee filters. These layers are crimped together about their perimeter as indicated at [the number] 34. This forms an easily handled, disposable, multi-layer filtering unit. Thus, the coffee grounds CG are filtered by the metallic filter 18, and the brewed coffee is also filtered by the paper filter 30 to remove harmful lipids and coffee grounds which may effect a rise in the cholesterol levels in a user of the brewed coffee. The modified paper filter 30 [of the type sold under the trademark are] is preferably placed directly on the metallic filter 18, and the ground coffee beans CG are placed directly onto the paper filter.

The paragraph beginning at column 4, line 3, has been amended as follows:

A prototype of the filtering device [of the present invention] was constructed, tested, and shown to be effective. The prototype was sized and shaped to fit the espresso holding pan of a Rancilio brand machine, Model No. MISS 935624, made by Rancilio of Italy. Thus,

it was approximately circular in shape with a diameter of approximately 5 cm (which, of course, can be custom made to fit any size holding pan) and [comprised] was formed of two layers of standard filter paper derived from filters of the cone variety. It was, as a consequence, twice the standard thickness of conventional coffee filters.

The paragraph beginning at column 4, line 14, has been amended as follows:

Some tests were made on the filtering device 10 as follows. First, in order to determine the amount of oil in the coffee brewed without use of the paper filter, some coffee was brewed and allowed to chill in a refrigerator for [2-3] two to three hours in order to allow the oils to get on the surface of the liquid air interface. Copious quantities of lipids were found on the unfiltered coffee. On the other hand, approximately 80% less lipids were found on [the] coffee which was filtered by one layer of the paper filter 30, while approximately 95% of the lipids were removed from the coffee when two layers of the paper filter 30 were used. Negligible quantities of fine particulate coffee grounds were noted at the bottom of the cup when either one or two layers of filter paper were used compared to none. These observations are in agreement with other studies performed, such as those referred to above in the articles of Urgert, et [aL] al. and Van Desselorp, et al.

The paragraph beginning at column 4, line 38, has been amended as follows:

The foregoing detailed description is for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as [the invention] modifications will be obvious to those skilled in the art.

#### In the Claims:

Claim 1 has been amended as follows:

1. (Amended) A filtering device for an espresso-type coffee maker of the type having a spout to deliver heated water under high pressure to finely ground coffee beans to brew coffee therefrom, and a receptacle to receive brewed filtered coffee, means defining a flow path between said finely ground beans to said receptacle, comprising:

a [metallic] permanent filter in said path of heated coffee passing to the receptacle

which filter has openings sized to filter out the fine espresso coffee grounds; and  
at least one layer of filter paper in the path of the heated coffee passing to the  
receptacle.

Claim 4 has been amended as follows:

4. (Amended) In an espresso-type coffee maker of the type that delivers heated water under [3 to 15 bars of] elevated pressure to a pan in which finely ground coffee beans are present and from which brewed coffee is removed through a permanent filter, the improvement of a disposable paper filter across the flow path of the brewed coffee, said paper filter being of a thickness and size so as to effectively remove and trap lipids and fine grounds from the brewed coffee and to reduce the lipids in the brewed coffee [by at least 50%] and wherein said paper filter is sized and shaped to fit over and adjacent the top of said permanent filter between said permanent filter and said finely ground coffee and said filing ground coffee is positioned above and on said paper filter so that the paper filter also serves to aid in removing, in a single operation, the used grounds as well as the paper filter from the coffee maker.

Claim 5 has been amended as follows:

5. (Amended) The [invention] improvement of claim 4 wherein the paper filter is of such a thickness and size so as to effectively remove and trap lipids and fine particulate grounds from the brewed coffee so as to remove approximately 95% of the lipids that would be present absent the paper filter.

Claim 6 has been amended as follows:

6. (Amended) The [invention] improvement of claim 4 wherein said filter paper is made up of at least two layers of standard thickness coffee filter paper.

Claim 7 has been amended as follows:

7. (Amended) [The] A method of making lower lipids containing brewed coffee liquid in an espresso-type coffee maker of the type that makes coffee liquid by passing heated

water under elevated pressure [of 3 to 15 bars] through finely ground coffee beans held above a permanent filter comprising the steps of placing disposable paper coffee filter material, of the type that may absorb lipids, and of a size and shape to cover the permanent filter in the maker atop and covering the permanent filter, placing the finely ground coffee beans atop said paper coffee filter material and passing heated water at [a pressure of 3 to 15 bars] an elevated pressure through, sequentially, the coffee beans, [and through] said paper filter material, and said permanent filter to create brewed coffee liquid and to allow lipids therefrom to be absorbed by said paper filter material so as to make lower lipid containing coffee liquid.